FIGURE 15. *Panel A is a photograph that shows NC Highway 12 on Pea Island "going-to-sea" in a 1996 storm. Panel B shows the late 2007 effort to anchor the constructed barrier dune ridge along NC Highway 12 with an internal core of sand bags. Panel A photograph is from Pilkey and Thieler (1992). Panel B photograph is by D. Stewart, Pea Island Wildlife Refuge.*

700,000 yards^3 of sand were mined from the fillet south of the jetty by NC DOT and trucked down the coast to construct dune ridges. However, Pea Island's ocean shoreline continues to erode at average rates up to 13 feet/year, one of the fastest erosion rates in North Carolina. The consequence is that there are three "hot spot" segments of Pea Island where NC Highway 12 has previously "gone-to-sea" (Fig. 15). Even after being relocated to the west, the road on these three segments is continuously threatened. Every storm requires teams of bulldozers to mine the overwash sand and rebuild one or more constructed dune ridges.

Pea Island has been dominated by inlets and overwash throughout the last 500 years of its history. A new inlet could open in several places along the island depending upon the location and magnitude of a storm. In the context of this history and an ever-narrowing Pea Island, threatened by overwash and inlet formation, the proposals for construction of a new Oregon Inlet bridge and Pea Island road are complex and expensive. One alternative is to build a new bridge parallel to the present bridge, maintain the Pea Island road on its present right of way, and rebuild new segments of road as needed. However, the Pea Island road, even with continued beach nourishment and construction of barrier dune ridges, is expected to ultimately require either elevation or relocation to a back-barrier causeway at some time within the life span of the new bridge. Minimum cost estimates for the parallel Oregon Inlet bridge and Pea Island road (to 2060) range from $602 million to $1.58 billion.

A second alternative is to build a back-barrier bridge-causeway across the Oregon Inlet FTD and into the deeper water of Pamlico Sound. This 17-mile long structure would return to the barrier island in the village of Rodanthe (Fig. 1). Minimum cost estimates for the back-barrier corridor (to 2060) range from $1.3 billion to $1.8 billion.

Constructed Barrier Dune Ridges

Natural coastal processes in the northern part of the state were forever altered in the late 1930's by construction of barrier dune ridges from the Virginia line south to Ocracoke Inlet. Continued reconstruction and maintenance of the

FIGURE 16. *Barrier-dune ridges are constructed today with NC DOT bulldozers (Panel A). The dunes are fertilized and grassed (Panel B) in an effort to protect NC Highway 12. Because the barrier-dune ridge is out of equilibrium with beach dynamics during storms, the dune ridge is eroded and scarped on the ocean side (Panel C) and will, ultimately, be breached. Photographs are by S. Riggs.*